

(d) Each separator must be designed in accordance with the applicable requirements in subchapters F and J of this chapter.

(e) Each separator must be designed to be operated both automatically and manually. Each separator to be installed in an unattended machinery space must be capable of operating automatically for at least twenty-four (24) hours.

(f) Each separator must be designed so that adjustments to valves or other equipment are not necessary to start it.

(g) Each part of a separator that is susceptible to wear and tear must be readily accessible for maintenance in its installed position.

(h) A separator must be designed so that it does not rely in whole or in part on dilution of influent mixtures as a means of performing its function.

**§ 162.050-23 Separator: Approval tests.**

(a) *Test Conditions.* (1) Each test described in this section must be performed at a throughput and influent pressure equal to the maximum throughput and pressure at which the separator being tested is designed to operate. The tests and each of the steps in the tests must be carried out in the order described in this section. Each test must be performed without time delay between steps in the test.

(2) Except as provided in Test No. 6S, the influent oil used in each test must be a heavy fuel oil that has a relative density of approximately 0.94 at 15 °C and a viscosity of at least 220 centistokes (approximately 900 seconds Redwood No. 1) at 37.8 °C.

(3) A test rig of the type described in § 162.050-17 must be used in performing each test.

(4) If a separator has a supply pump, it must be tested using that pump. If a separator does not have a supply pump, it must be tested using the mixture pump on the test rig.

(5) The influent water used in each test must be clean fresh water or clean fresh water in solution with sodium chloride. The water or solution must have a relative density at 15 °C that is equal to or less than 0.085 plus the relative density of the heavy fuel oil used in the tests.

(6) Each test must be conducted at an ambient temperature of between 10 °C and 30 °C.

(7) The oil content of each sample must be measured using the method described in § 162.050-39.

(8) Influent oil content must be determined during testing by measuring the flow rates of the oil and water that are mixed to form the influent or by use of an oil content meter on the inlet piping of the test rig. If an oil content meter is used, a sample of influent and a meter reading must be taken at the beginning of each test. If the meter reading is not within  $\pm 10$  percent of the oil content of the sample, the meter readings subsequently taken during the test are unacceptable test results.

(9) When collecting a sample at a sample point that has a stop cock, the first minute of fluid flow through the stop cock must not be included in the sample collected.

(10) In each test, the separator must be operated in accordance with the procedures described in its instruction manual.

(11) No maintenance, including replacement of parts, may be performed on a separator during or between the tests described in this section.

(12) A one (1) liter sample of each oil to be used in testing must be taken and provided for use in the sample analysis required by § 162.050-39.

(13) The separator may not be operated manually in Test No. 5S.

(b) *Test No. 1S.* The separator is filled with water and started. It is fed with oil for at least five (5) minutes and then with an oil-water influent containing an oil content of between 5,000 and 10,000 p.p.m. until a steady flow rate occurs. After the flow rate is steady, the influent is fed to the separator for thirty (30) minutes. Samples of separated water effluent are taken after the first ten (10) and twenty (20) minutes. At the end of the thirty (30) minute period, the air cock on the test rig is opened and, if necessary, the oil and water supply valves are closed to stop the flow of influent. A sample is then taken of the separated water effluent as the effluent flow ceases.

(c) *Test No. 2S.* Test No. 1S is repeated using an influent containing approximately 25 percent oil and 75 percent water.

(d) *Test No. 3S.* The separator is fed with oil until oil is discharged at the oil discharge outlet of the separator at essentially the same rate that oil is being fed to the separator. The separator is then fed with oil for five (5) additional minutes. If any oily mixture is discharged from the separated water outlet on the separator during the test, that observation is recorded.

(e) *Test No. 4S.* The separator is fed with water for fifteen (15) minutes. Samples of the separated water effluent are taken at the beginning of the test and after the first ten (10) minutes.

(f) *Test No. 5S.* The separator is operated automatically for three (3) hours. During the test, the separator is continuously fed with an influent varying from water to a mixture of 25 percent oil in water and back to water every fifteen (15) minutes. The oil concentration in the influent is varied in at least five (5) equal increments during each fifteen (15) minute period and the time intervals between the incremental changes are equal. During the last hour, the separator must be inclined at an angle of 22.5° with the plane of its normal operating position. During the last time increment in which the unit is fed a 25 percent oil mixture, a sample of the separated water effluent is taken. If the separator stops at any time during this test, that observation is recorded.

(g) *Test No. 6S.* Tests No. 1S and No. 2S are repeated using, in lieu of a heavy fuel oil in the influent, a light distillate fuel oil having a relative density of approximately 0.83 at 15 °C.

**§ 162.050-25 Cargo monitor: Design specification.**

(a) This section contains requirements that apply to cargo monitors.

(b) Each monitor must be designed so that it is calibrated by a means that does not involve manually mixing a known quantity of oil and a known quantity of water to form a mixture and manually feeding the mixture into the monitor.

(c) The electrical components of a monitor that are to be installed in an explosive atmosphere must be approved by an independent laboratory as components that Underwriters Laboratories Standard 913 (dated April 8, 1976) defines as intrinsically safe for use in a Class I, Group D hazardous location.

(d) Each monitor component that is a moving part must be designed so that its movement during operation of the monitor does not cause formation of static electricity.

(e) A monitor must be designed to operate in each plane that forms an angle of 22.5° with the plane of its normal operating position.

(f) Each monitor must be designed in accordance with the applicable requirements contained in subchapters F and J of this chapter.

(g) Each monitor must be designed so that it records each change in oil content of the mixture it is measuring within twenty (20) seconds after the change occurs.

(h) Each monitor must have a device that produces a warning signal and a signal that can be used to actuate valves in a vessel's fixed piping system, when—

(1) The oil content of the mixture being measured exceeds the concentration limit set by the operator of the monitor; and

(2) Malfunction, breakdown, or other failure of the monitor occurs.

(i) Each monitor must have a means to determine whether it is accurately calibrated.

[44 FR 53359, Sept. 13, 1979, as amended by CGD 76-088c, 48 FR 45727, Oct. 6, 1983]

**§ 162.050-27 Cargo monitor: Approval tests.**

(a) This section contains requirements that apply to cargo monitors.

(b) *Test conditions.* (1) The tests and each step in the tests must be carried out in the order described in this section. Each test must be performed without time delay between steps in the test.

(2) A test rig of the type described in § 162.050-19 must be used in performing each test.

(3) Each mixture used during the tests must be prepared by combining oil supplied from the oil injection pipe